NOAA Ship OSCAR DYSON

Cruise DY-08-11 Metadata

BERING-ALEUTIAN SALMON INTERNATIONAL SURVEY
BSIERP - EASTERN BERING SEA SHELF

September 10 – 30, 2008

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Directory Structure of the DY-08-11 Cruise Data DVD:

- **Bongo Data** – contains Sea-Bird Seacat data and program files.
- **CTD Data** – contains Sea-Bird CTD data and program files, and .pdf scans of CTD cast sheets.
- **Data Documentation** – contains files which document the data contained on the DVD.
    - **Furuno (SeaTemp) Calibration Data** folder – contains data used in the calibration of the Furuno through-hull sea temperature sensors. Note: regression coefficients used for all SeaTemp-C-Cal (calibrated) data are from the 06 February 2008 comparison with MACE's SBE39, S/N 1396. All data from 26 January 2008 (warm water) and 06 February 2008 (cold water), and both SBE39s (S/N 1396 and S/N 1438), can be combined to generate more comprehensive regression coefficients. New coefficients can be applied to the raw Furuno sea temperature data (sensors: High-SeaTemp-C, Mid-SeaTemp-C, and Low-SeaTemp-C). Contact SST Kathy Hough if future calibration data is desired for refinement of regression coefficients.
    - **Instrument Calibrations** folder – contains scans of maintenance and calibration paperwork for oceanographic instruments used during the cruise.
    - **Weather** folder – scans of Deck Weather Observation sheets. Observations are in ADT.
    - ***CTDSeacat SCS Data Format.doc*** – contains the format of the real-time SCS backup data for CTD and Seacat casts.
    - ***Derived Sensor Problem.doc*** – describes a SCS programming bug that adversely affects all **derived** sensor *.Raw data files, and EventData files that utilize derived sensor values. It was also discovered that when instruments are turned off, the last written raw data values for **non-derived** sensors also continue to write to EventData files. Compare TSG-RAW_yyyymmmdd-hhmmss.Raw files to SciH2OSys_SNAP_compiled.elg and SciH2OSys_Continuous_###.elg EventData files for possible examples of stagnant data. These are inherent programming aspects of the SCS software. It is not possible to edit all of the *.Raw or EventData files in the field.
    - ***Draft Mark ABL Corrections.pdf*** – contains corrections to draft mark heights above baseline. Draft marks are in reference to a horizontal flat baseline, not the keel.
    - ***EventData File Summary.xls*** – details the time frames of EventData files and lists the SCS sensors logged to Bridge, NavMetOce, SciSeawaterSystem, OceoOps, and Transect EventData files.
    - ***Fishing Continuous_compiled_A.elg*** and ***Fishing Continuous_compiled_B.elg*** – comprehensive, partially edited 1-second continuous data between EQ and Haul Back (individual data values not edited due to SCS programming bugs).

- ***Fishing Snap_compiled.elg*** – comprehensive, partially edited file of events recorded during trawls by scientific personnel (individual data values not edited due to SCS programming bugs).
- ***Metadata.doc*** – this file.
- ***MOA Snap_compiled.elg*** – comprehensive, partially edited file of events recorded by the bridge (individual data values not edited due to SCS programming bugs).
- ***OceoOps Continuous_compiled.elg*** – comprehensive, partially edited 1-second data for Juday, Pairvet, and Bongo casts (individual data values not edited due to SCS programming bugs).
- ***OceoOps Snap_compiled.elg*** - comprehensive, partially edited file of events recorded during CTD, Juday, Pairvet, and Bongo casts by scientific personnel (individual data values not edited due to SCS programming bugs).
- ***SciH20Sys_SNAP_compiled.elg*** – comprehensive, partially edited file of scientific seawater system events (individual data values not edited due to SCS programming bugs).
- ***Sensor Comments.xls*** – copy of the primary sensor.scf file used during the cruise. This file lists each SCS sensor, file names (equal to ParentSensorName_yyyymmdd-hhmmss.Raw), logging folders, base sensors and coefficients used in derived sensors, etc. This file also describes the validity of each sensor's data, and thus each sub-directory/file in the "SCS Data" directory.

- **SCS Data** – contains:
  - All raw sensor data in individual folders (GPSMX420, POSMV, TSG, Fluorometer, etc.).
  - **EventData** folder (contains separate folders for all Events run during the cruise). Note: Use *compiled* file versions if they exist; they contain any edits made and are comprehensive. Further editing of individual data values in all EventData files may be required post-cruise due to SCS programming bugs.
    - Bridge – the event run on the bridge (contains MOA Snap, MOA Continuous, Fishing Snap, and Fishing Continuous files).
    - NavMetOce – continuous data for the cruise logged at 5, 30, and 60 second rates. This data can be used to add or replace data lines in cruise-specific event files.
    - OceoOps – the event run in the dry lab next to the Seabird computer and used to log CTD, Juday, Pairvet, and Bongo operations.
    - SciSeawaterSystem – event run in the Chemlab next to the scientific seawater system. See SciH2OSys_SNAP_compiled.elg for sample data, cleaning events, system outages, and comments about system data.
    - Transect - contains Start, End, Break and Resume Acoustic Transect data. Files do not contain any edits made by ship personnel.
    - NODC, SAMOS (1-minute moving average data), and TsgTransmitter – unrelated projects to the cruise, but folders contain potentially useful files.

EventData Editing Notes:

- Bridge EventData – edited by ST Sheehan
  - MOA Snaps – the "compiled" version contains edits.
    - DOPPLER ON/OFF lines: The Doppler was turned on and off, typically when approaching and leaving shallow areas or during station operations. Doppler ON/OFF lines were checked and are within seconds of .RAW data records. Raw Doppler, Speed over Ground, and Centerboard position data contained within SCS raw data can be used in combination to determine desirable time periods to include in EK60 data analyses.
    - Centerboard position lines are within seconds of CenterBoard-RAW* data.

        - Sunrise and Sunset times have been edited if Notes were made by bridge personnel. Missing Sunrise and Sunset times can be found by filling out Form B at http://aa.usno.navy.mil/data/docs/RS_OneDay.php
    - Fishing Snap and Continuous files – the "compiled" versions contain edits.
- OceoOps EventData – edited by SST Hough
    - OceoOps Snap and Continuous files – the "compiled" versions contain edits/comments.
- SciSeawaterSystem EventData – edited by SST Hough
    - The Snap files have been compiled and edited in the ***SciH2OSys_SNAP_compiled.elg*** file. Sensor data values may be in error (see comments about SCS programming problems above, known logging errors below, and in the compiled file).

Additional Comments:

ALL data and noted times, except Deck Weather Observations, are in GMT/UTC.

Scientific Seawater System:

- A new WetLabs combination fluorometer (FLNTU), S/N 1075, was installed aboard the OSCAR DYSON on July 9, 2008. Count data are in the Fluorometer-RAW_yyyymmdd-hhmmss.Raw data files. For DY0811, corresponding sensors in engineering values are "Chloro" in micrograms/liter and "NTU" (Turbidity in Nephelometric Turbidity Units).
- Flow is separated into three adjustable lines with flow meters: 1) Oxygen Optode/Fluorometer, 2) SBE45 TSG, and 3) ISUS. A fourth line fed the ac-s and was used for water sampling.
- Flow tends to be lower going through Filter 1 (elevated above Filter 2 location).

Depth Below Surface data:

- If the centerboard was in the retracted position (SCS value = 13.5), then use the depth variable EK60-Depth-CBRet-m-Value **or** Doppler-Depth-m-Value (only if the Doppler was ON – check DOPPLER-VDDPT-RAW_yyyymmdd-hhmmss.Raw data files to verify operational status).
- If the centerboard was in the lowered position (SCS value = 18.68), then use the depth variable EK60-Depth-m.

ITIs:

- Gaps in ITI depth data may exist due to it falling outside of the set range.

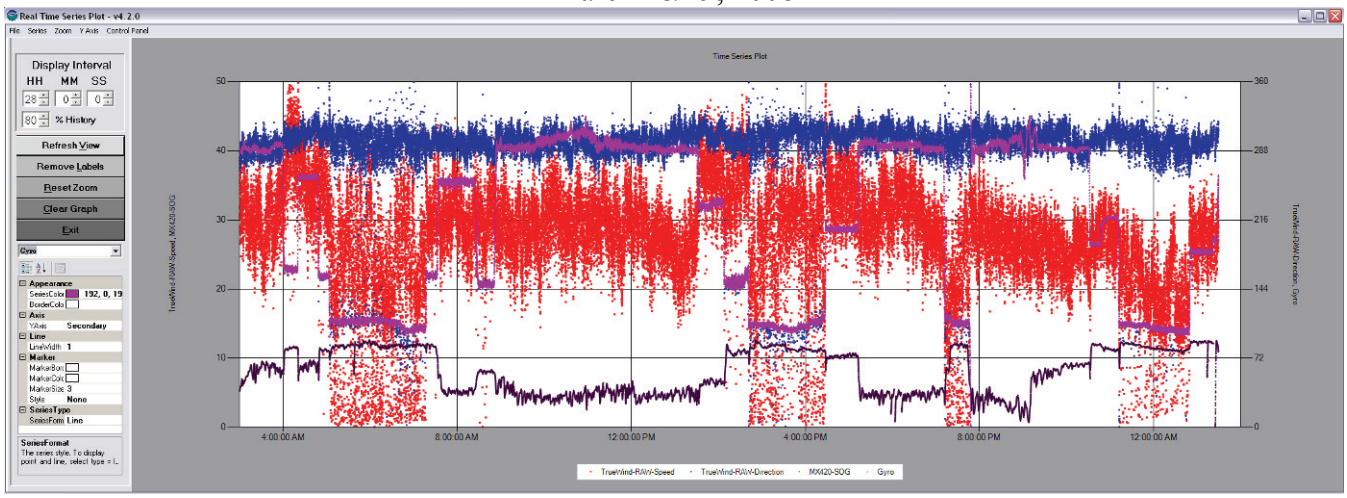
SCS Basics:

- Data file names = Parent Sensor Name_yyyymmdd-hhmmss.Raw. Parent sensors are highlighted in yellow in ***Sensor Comments.xls*** and are listed in Column B.
- Data directly from sensors have "RAW" as part of the file names, before the time-stamp. Derived, or calculated, Parent sensors do not have "RAW" before the time-stamp (TrueWind-RAW is the only exception).
- Child sensors are the comma-delimited variables, or columns, within SCS data files.
- The first two columns of every SCS file equal the SCS server's date and time (GMT).

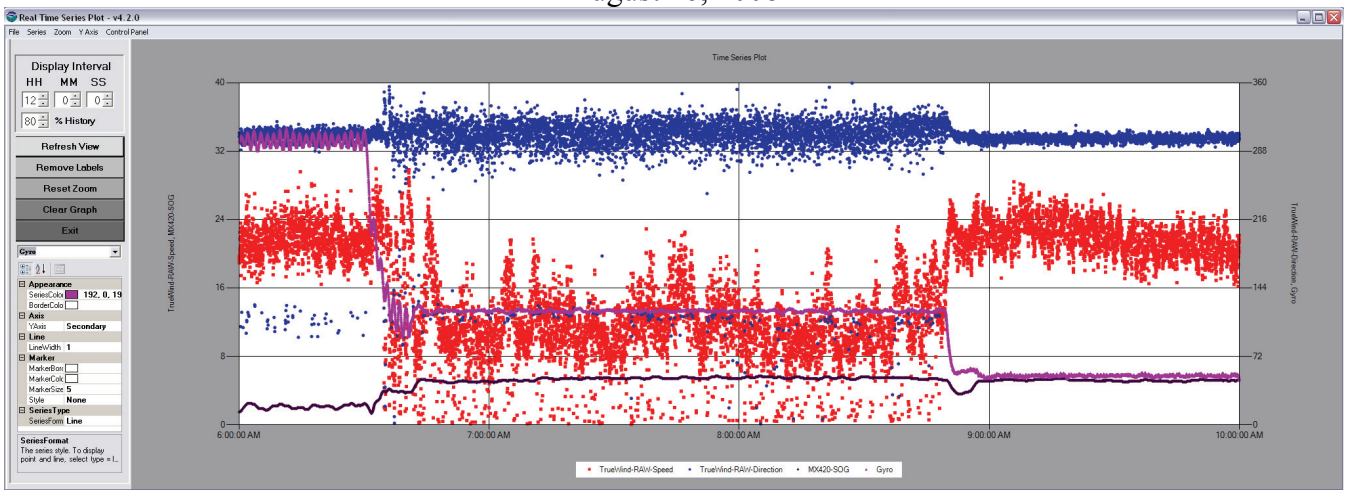
Observed Problems with Sensor Data

Wind Speed and Direction: Wind (relative and true) data is variable and unreliable when the wind is coming from astern. All wind data needs to be examined in relation to Gyro Heading and SOG data. Some examples may be from previous cruises:

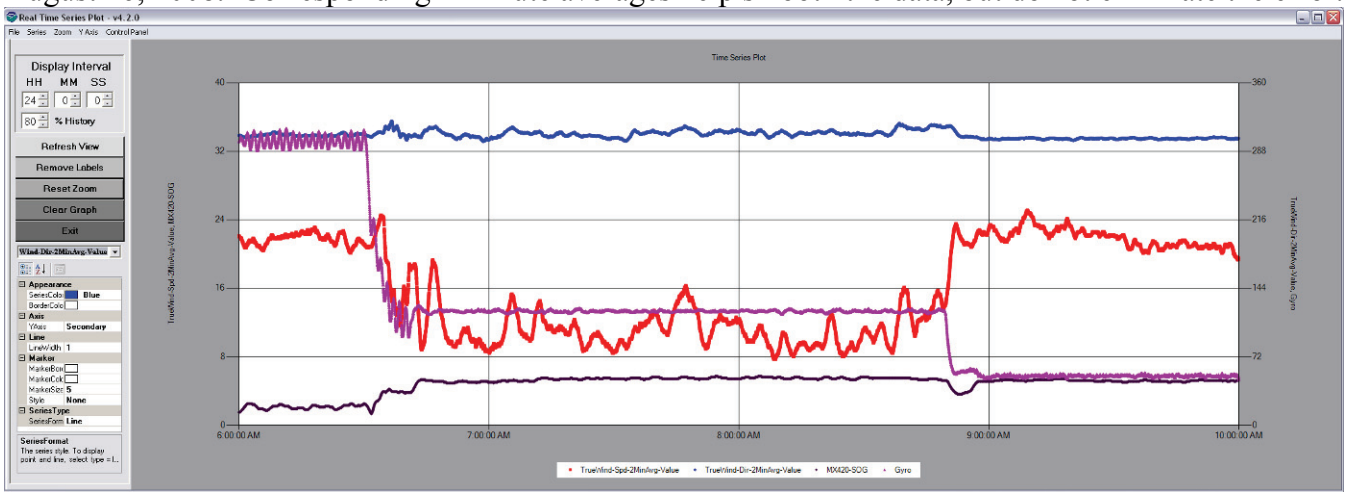
March 18/19, 2008



August 16, 2008

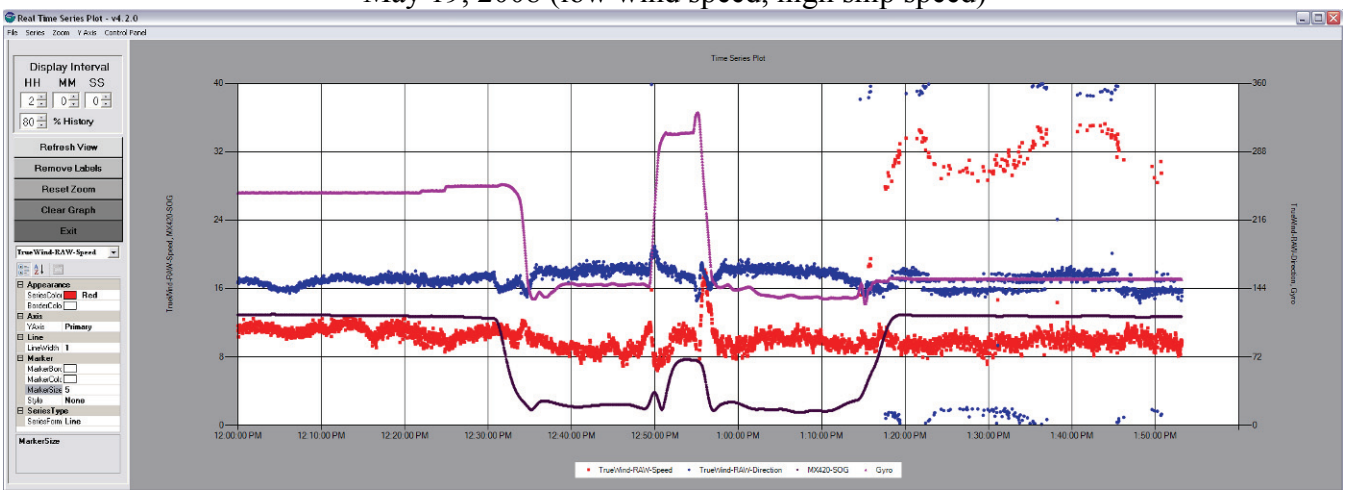


August 16, 2008. Corresponding 2 minute averages help smooth the data, but do not eliminate the error.

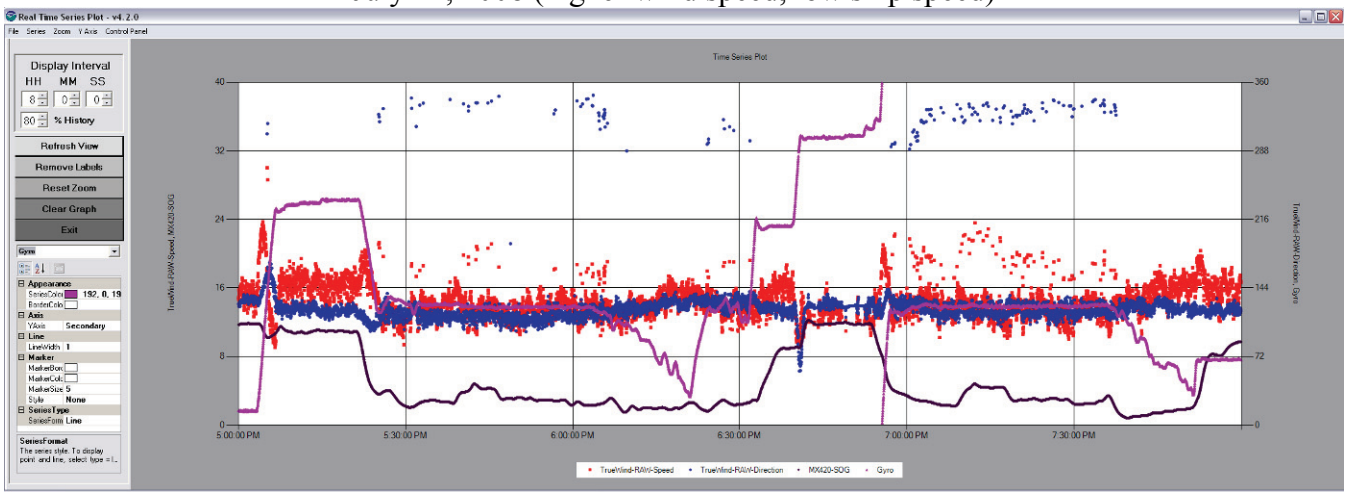


Wind data can be sporadic when heading directly into it too, at high and low wind and ship speeds.

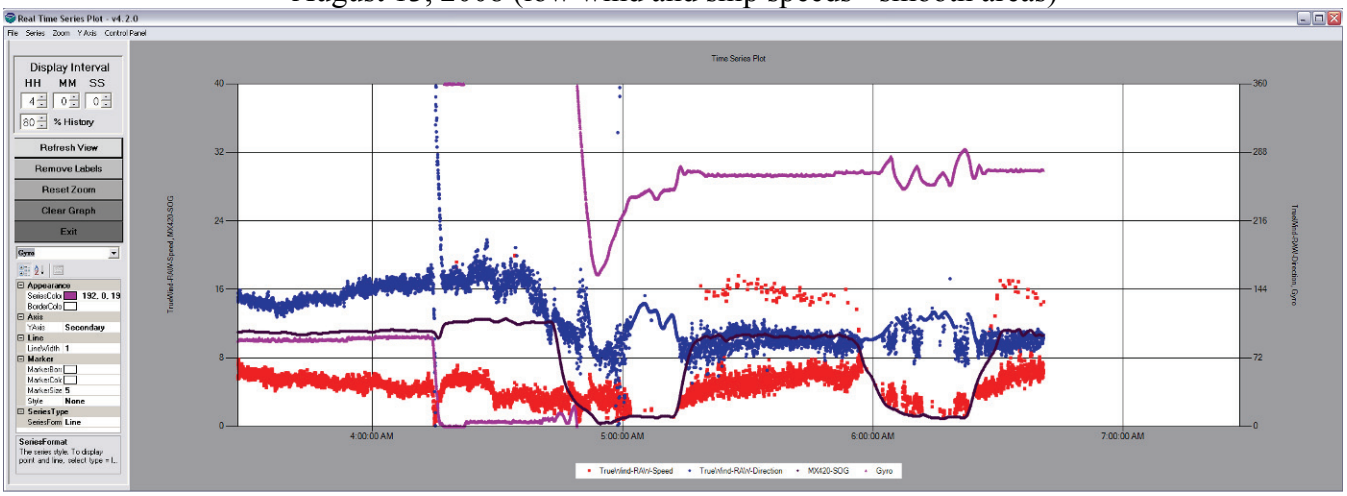
May 19, 2008 (low wind speed, high ship speed)



July 21, 2008 (higher wind speed, low ship speed)

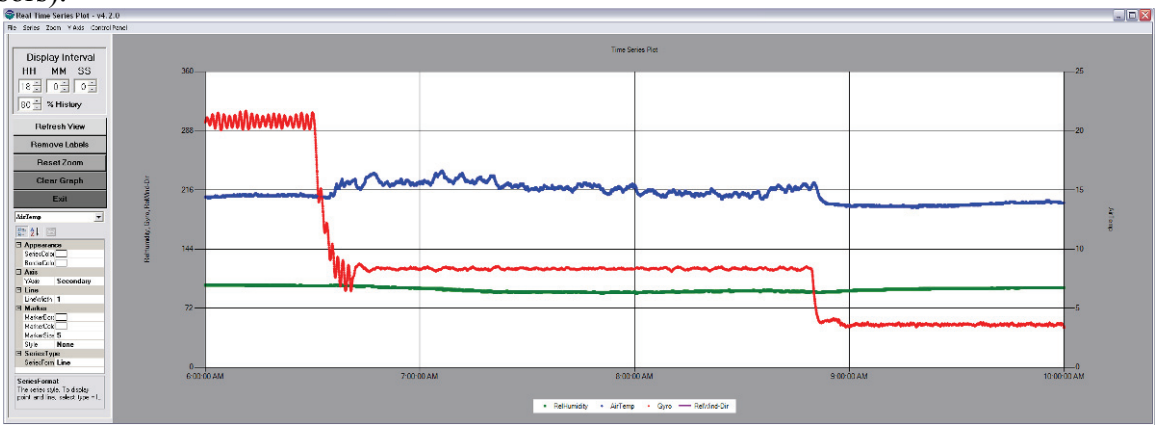


August 13, 2008 (low wind and ship speeds - smooth areas)

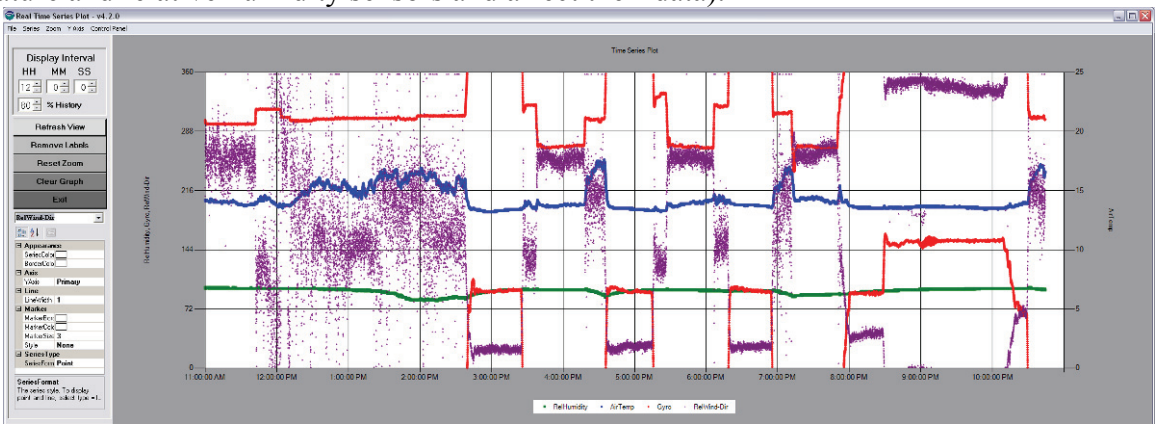


Air Temperature, Relative Humidity, Barometer Pressure: Other meteorological data can be affected by ship heading and/or wind direction.

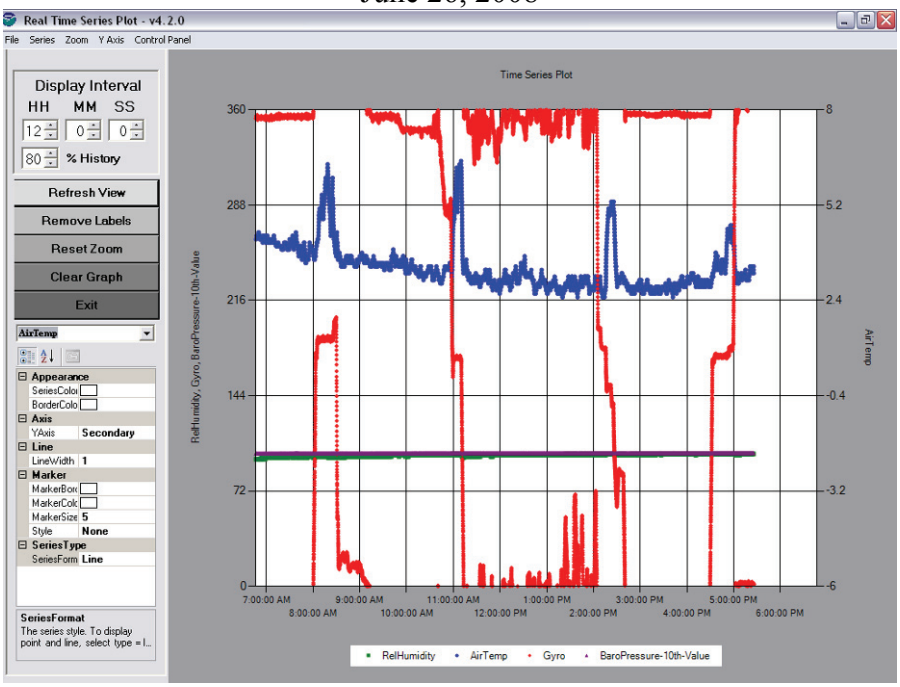
August 16, 2008 (same time period as two wind graphs above where wind was coming from behind the ship. Air temperature increased and relative humidity decreased likely due to stack exhaust passing by the sensors).



August 22, 2008 (when relative wind direction is around 215 degrees, stack exhaust can pass by the temperature and relative humidity sensors and affect their data).



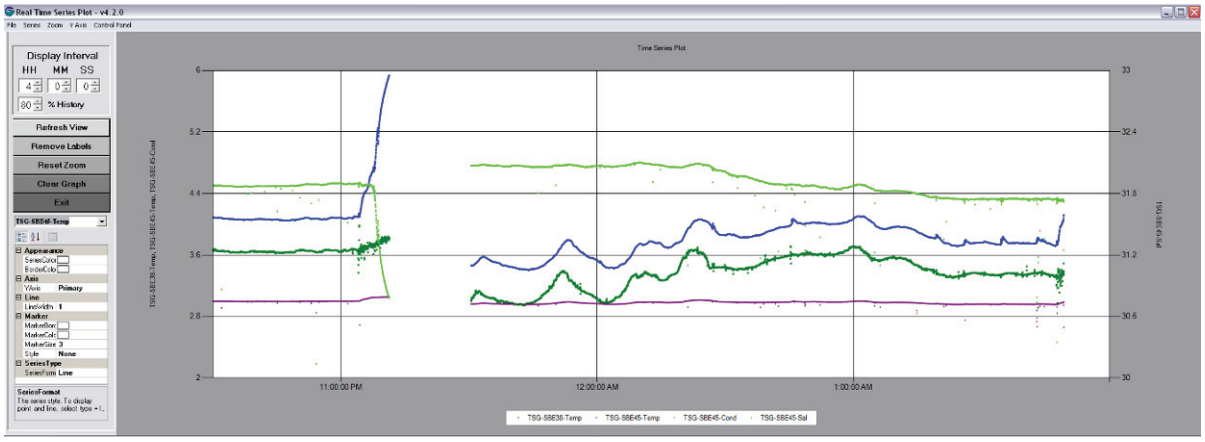
June 26, 2008



Scientific Seawater System

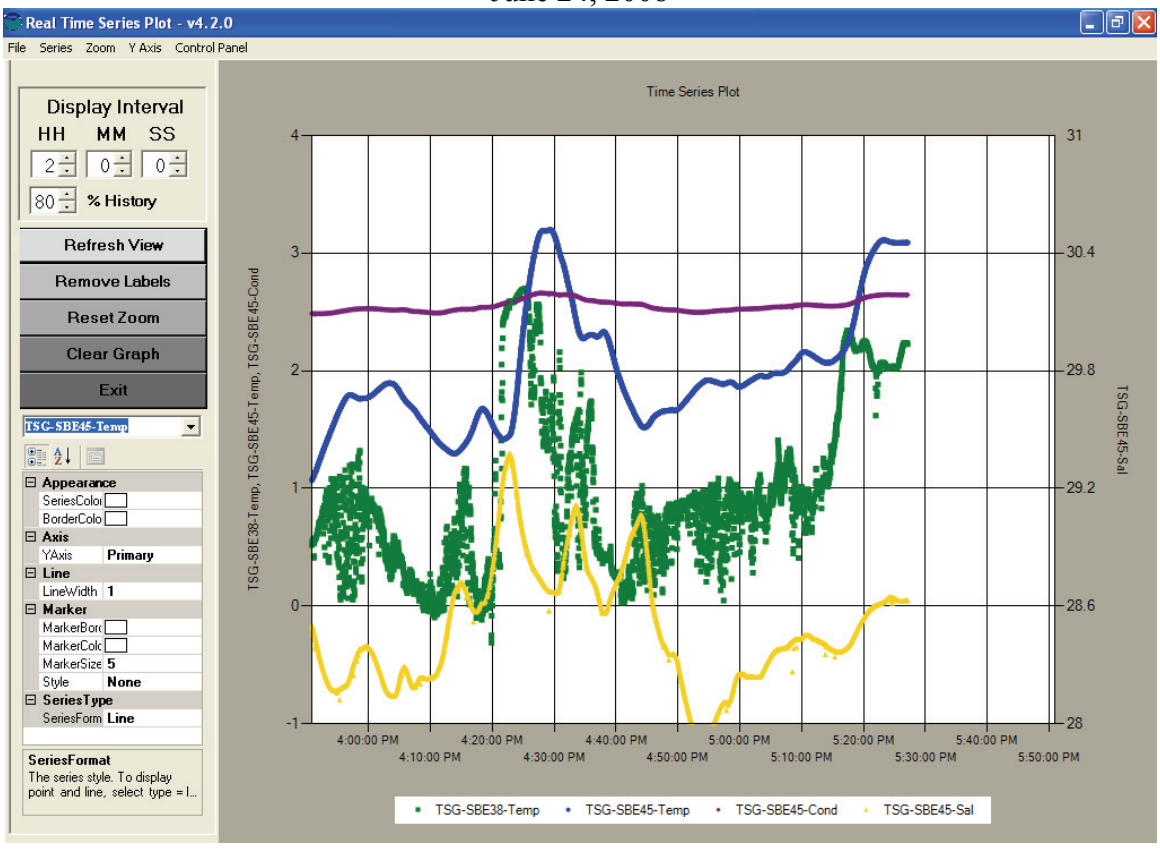
Rough seas can result in air getting into the scientific seawater system. Until discovered, data flow to SCS does not get turned off; thus, erroneous data may be logged to files (.RAW and EventData). SBE45, SBE38, Fluorometer, ISUS, and Oxygen data are affected. Also, changing filters causes brief, adverse effects on data. See SCS\EventData\SciSeawaterSystem\SciH2OSys_SNAP_compiled.elg for documentation of known events which may affect data. Examples are below (some are from previous cruises). Flow meter data from the unit in the Chemlab can be used to extract useful data periods (SCS SSSFlow-*_yyyymmdd-hhmmww.Raw data files).

Rough seas can cause erroneous data periods and subsequent system shutdowns.

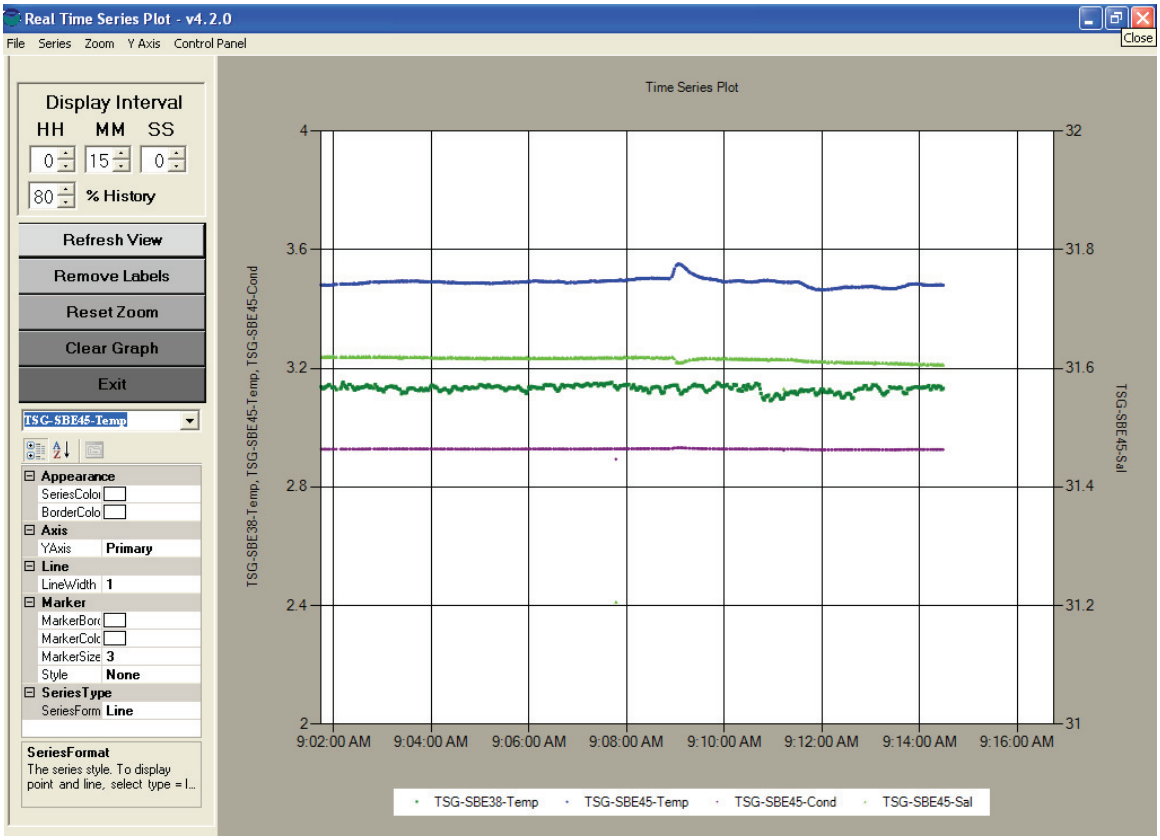


SBE45 temperature changes lag behind SBE38 temperature changes in time along with being warmer.

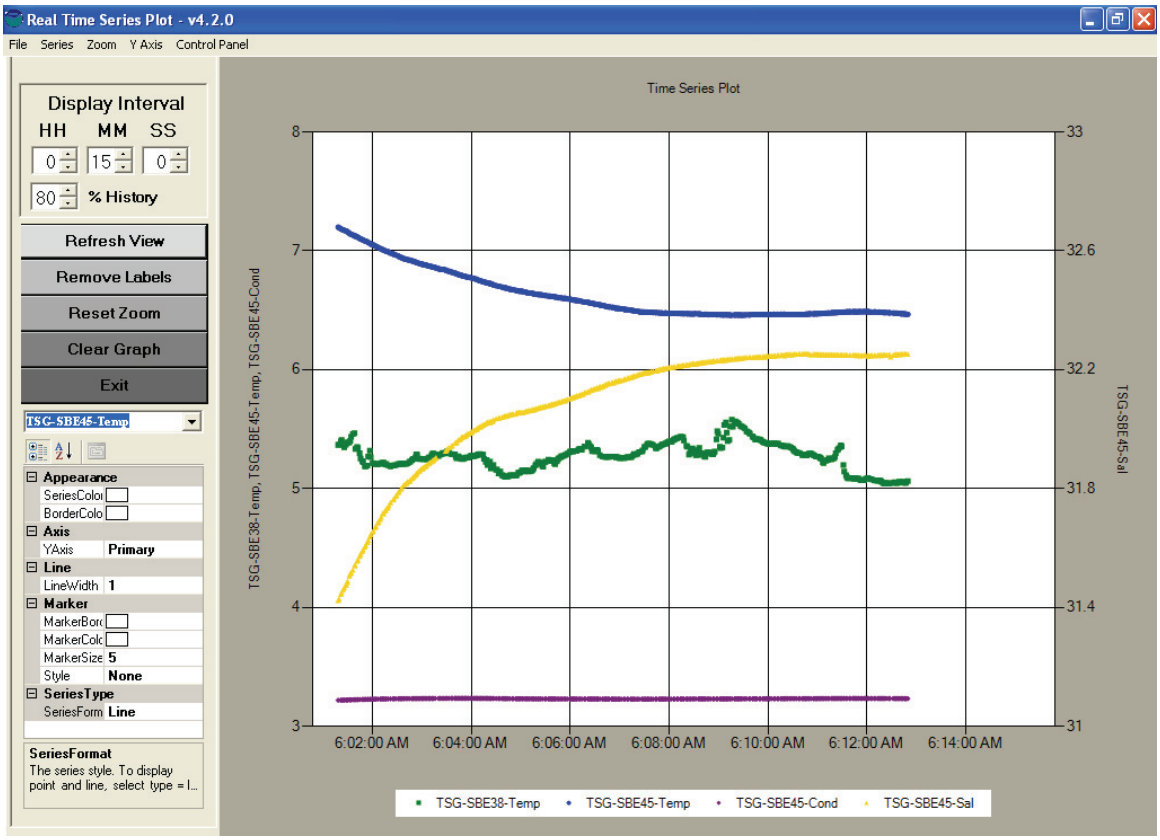
June 24, 2008



Changing filters causes slight, temporary effects to at least the SBE45 data. See SCS\EventData\SciSeawaterSystem\SciH2OSys_SNAP_compiled.elg for filter change times.

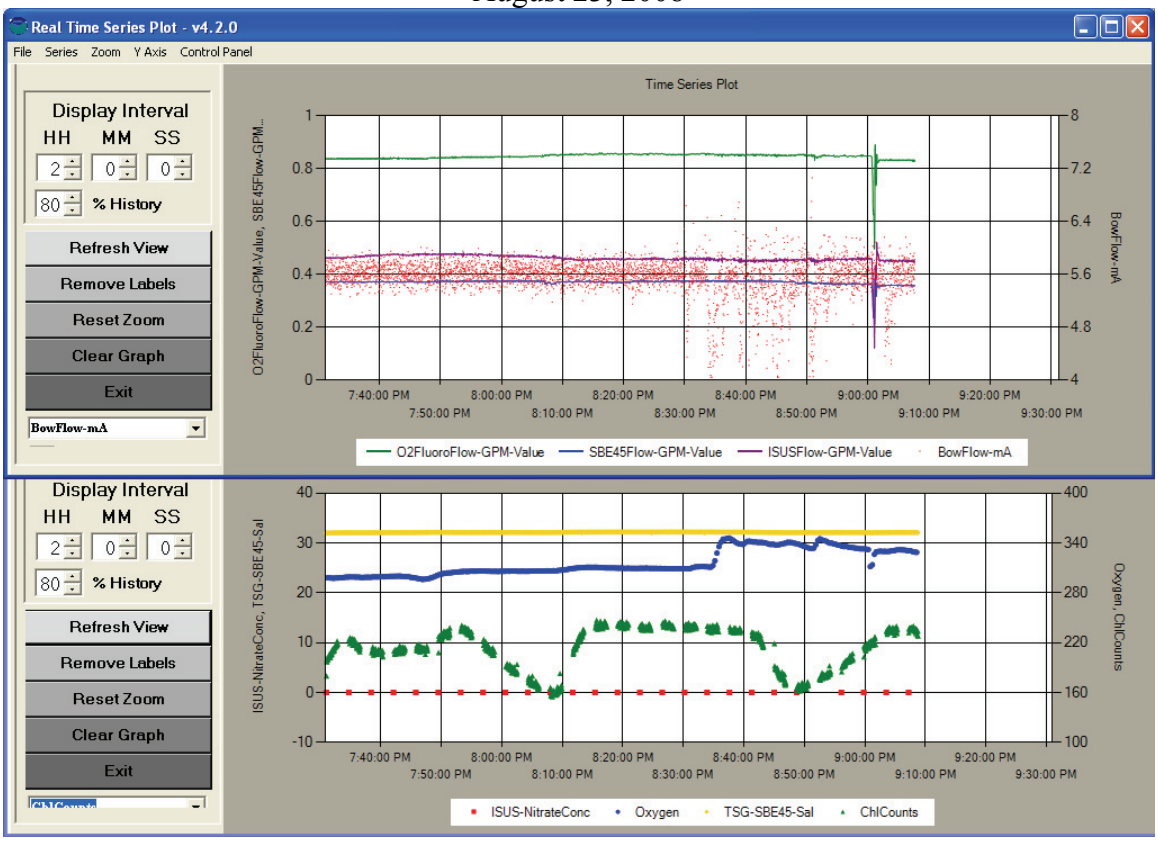


June 3, 2008 – System start-up and re-starts after cleaning may result in delayed stabilization of data.

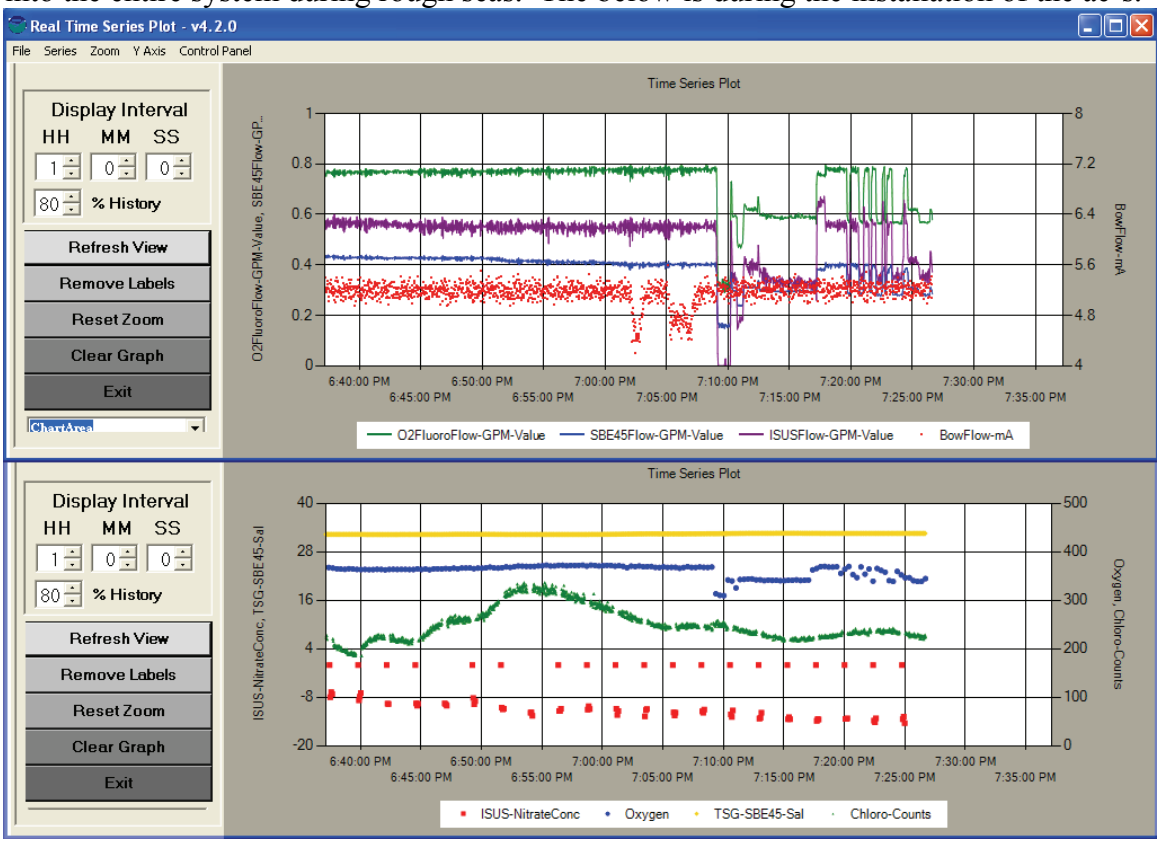


Rough weather introduces air into the system (BowFlow-mA sensor in red in upper graph), which affects oxygen data (blue in lower graph).

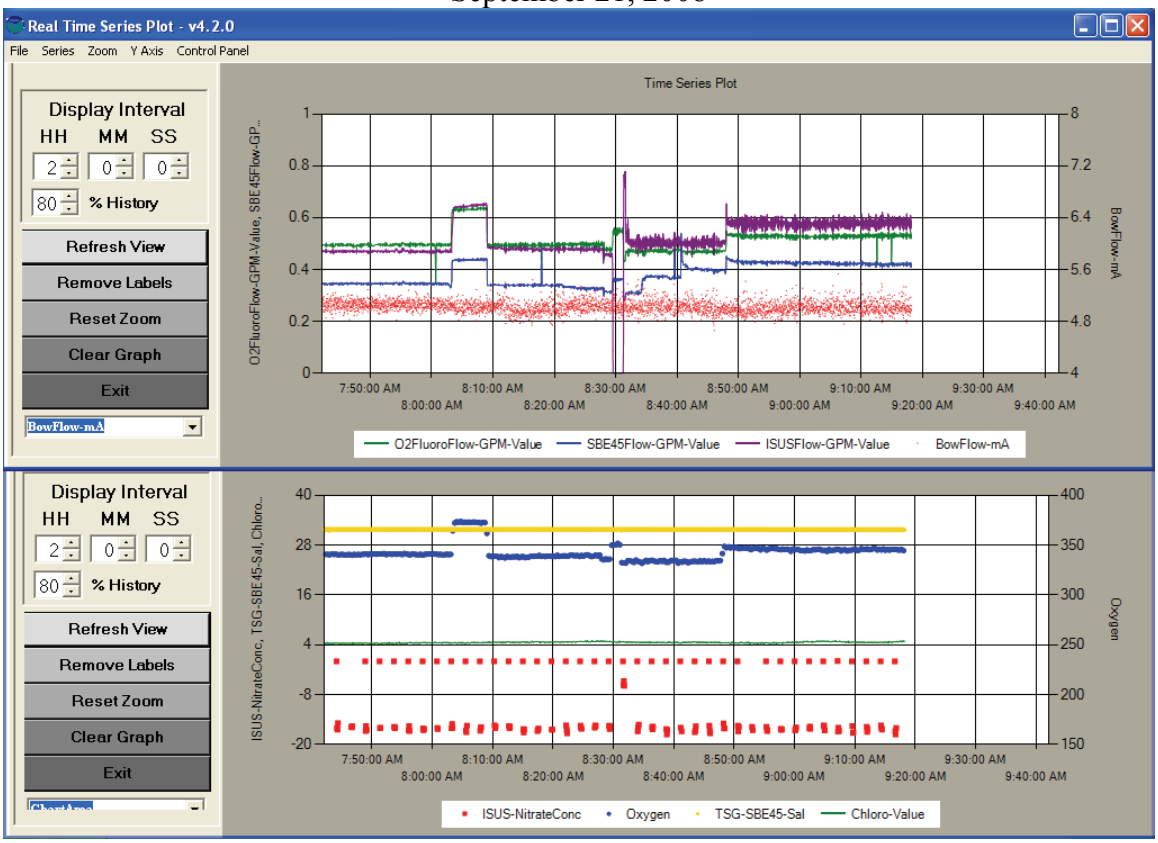
August 23, 2008



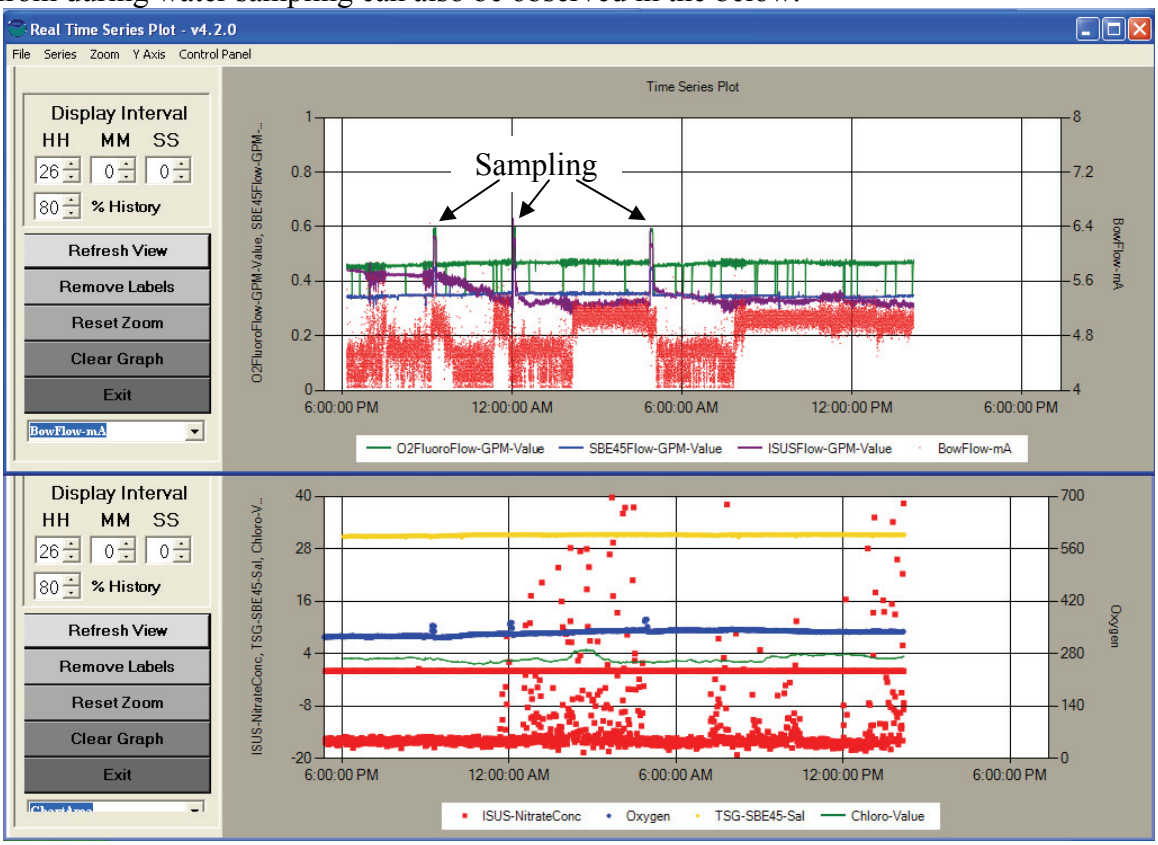
September 9, 2008 – Flow rate, adjustable at the instrument level, affects oxygen data in addition to air getting into the entire system during rough seas. The below is during the installation of the ac-s.



September 21, 2008



ISUS data tended to get noisy during flows less than ~ -0.35 GPM. Some noisy data periods are noted in the SciH2OSys_SNAP_compiled.elg EventData file. The below is from September 20, 2008 (ISUS flow is in purple in the top graph, and Nitrate Concentration data is in red in the lower graph). Oxygen spikes from during water sampling can also be observed in the below.



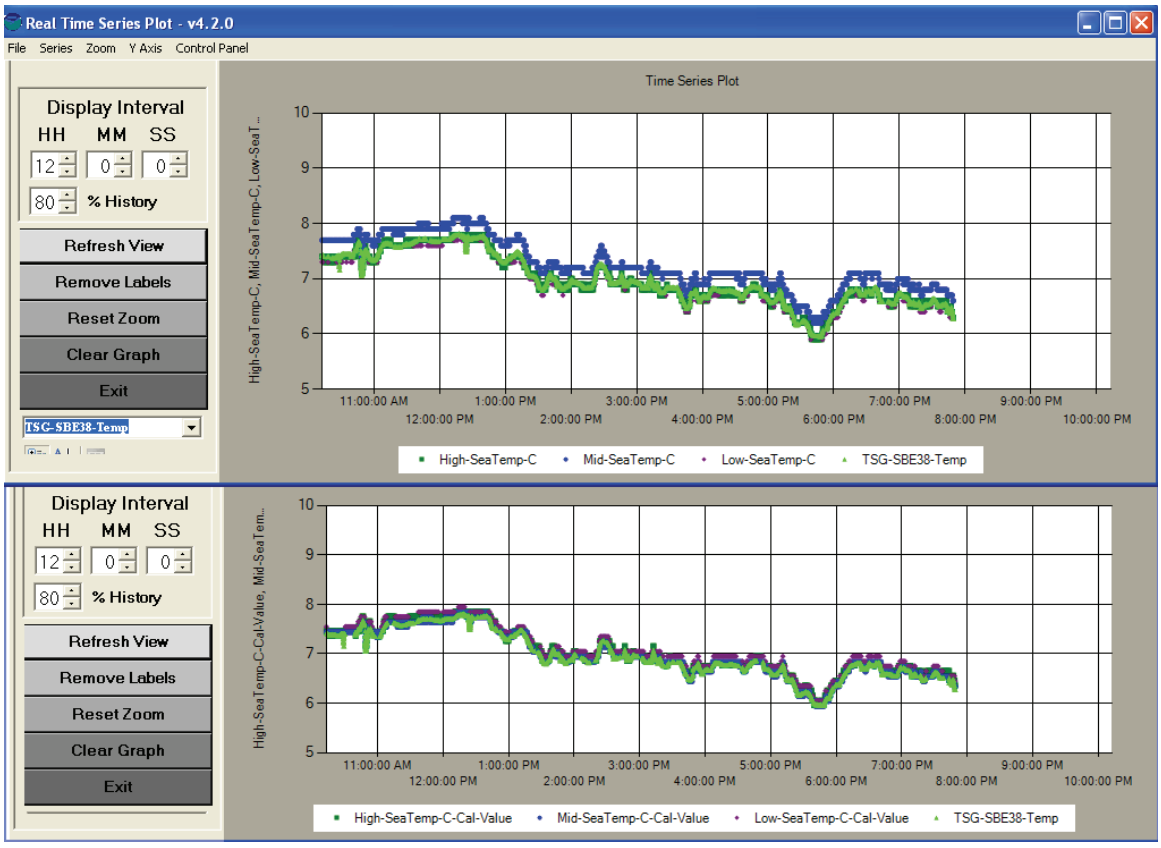
Furuno Hull (HIGH, MID, LOW) Sea Temperatures: These three thru-hull water temperature sensors are arranged vertically just forward of the hero deck on the starboard side. There is 0.75 m between each adjacent pair of sensors; 1.5 m between HIGH and LOW.

Raw sensor data is not calibrated. The MID sensor is noticeably ~0.3 C higher than the HIGH and LOW sensors. SBE39s have been lowered to the locations of each Furuno hull temperature sensor in order to calibrate them and compare them to the SBE38 temperature sensor that is at the bow intake (this water feeds the scientific seawater system). One calibration was done in Seattle, and a second calibration was done off Kodiak Island on February 6, 2008. See "\Data Documentation\Furuno (Hull Temp) Calibration Files" directory for the raw calibration data.

The top image shows un-calibrated data; the bottom image shows calibrated data based on the February 6, 2008 (cold water) regression coefficients for SBE39, S/N 1396:

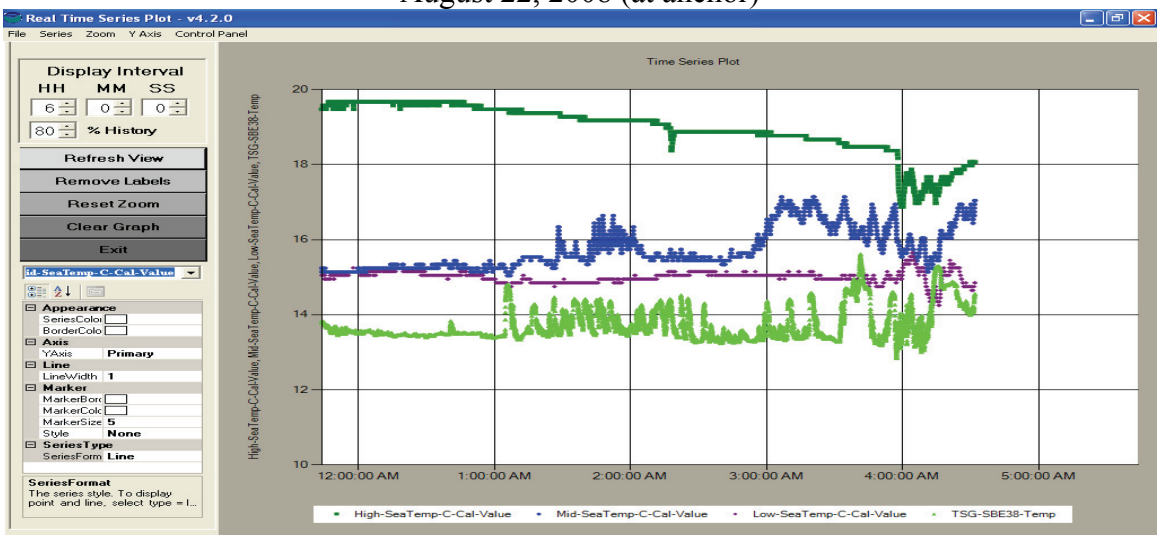
HIGH: m = 1.000015, y = +0.064798
MID: m = 0.999948, y = -0.254865
LOW: m = 1.000150, y = +0.149487

July 20, 2008. The calibrated through-hull temperatures and SBE38 temperature are almost always about equal while the ship is underway at higher speeds.

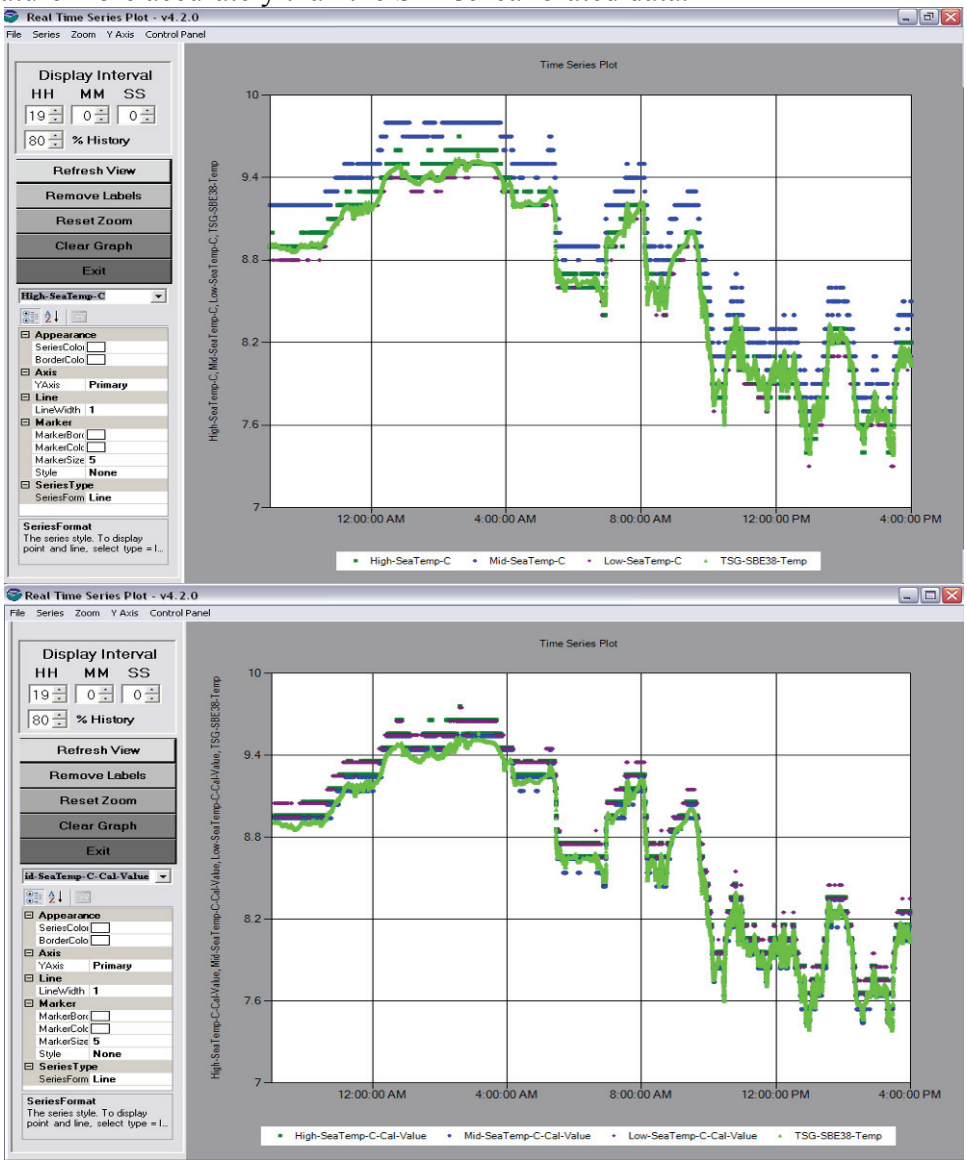


Water temperature differences can be observed at slower speeds (~ 5 knots) or while at anchor.

August 22, 2008 (at anchor)

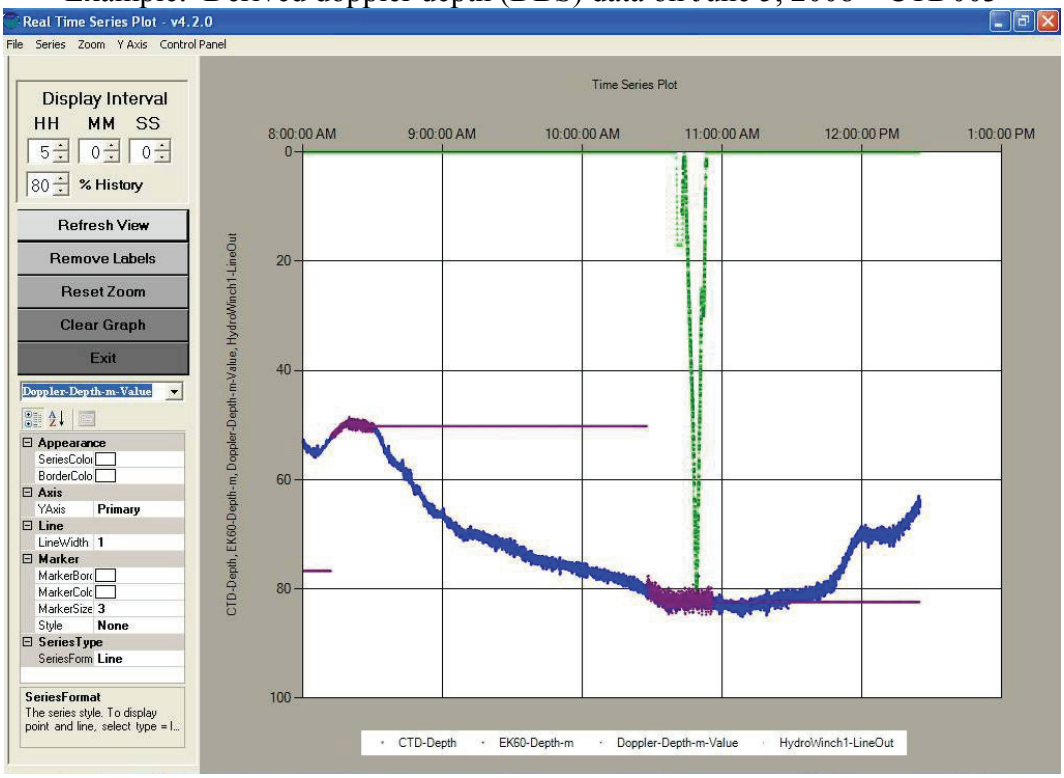


September 22/23, 2008 – 21:00 to 16:00. Raw High and Low Furuno temperature data appear to track SBE38 temperature more accurately than the SBE39 calibrated data.



Doppler derived values: Any data variable with "Value" as part of the name is suspect due to SCS programming bugs. Even if the instrument is turned off, derived data continue to write to *.Raw and EventData files. See Derived Sensor Problem.doc for more details.

Example: Derived doppler depth (DBS) data on June 5, 2008 – CTD003



POSMV data are sometimes in error. POSMV variables may or may not be affected simultaneously:

July 15, 2008 (04:34 – 07:32 GMT)